

Review of "Geochemical Exploration of the Moon and Planets,"
by I. Adler and J. Trombka

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Unlike stars, which radiate copiously on virtually all electromagnetic wavelengths, the silicate planets are relatively inert. For this reason, they and the moon have until recently been essentially impossible to analyze from earth. But in the decade since interplanetary flight was first achieved, a wide variety of techniques have been developed for performing extraterrestrial chemical and mineralogical analyses without bringing samples back to earth. This deceptively small book by Adler and Trombka reviews these techniques, as well as some of those used to analyze samples returned from the moon.

"Geochemical Exploration" is a remarkable book- one of those that jolts the reader into realizing that we are, after all, within three decades of the 21st century. The primary focus is on the techniques already used, or to be used, for compositional analysis of the moon and planets. There are several concise summaries of the results of such analyses, but the book is primarily about geochemical instruments, not about geochemistry. The scope of the subject matter covered is, by pre-space age standards, nothing less than astounding, including atomic physics, geochemistry, electronic instrument design, data reduction, and astronautics. Much of the source material, particularly from Russian missions, is hard for the non-specialist to find, and the authors have performed a service in this regard alone.

After an introduction to the main problems of planetology, the book begins with a chapter on techniques already used, as of press time, on space missions, including those of the Surveyor and Ranger programs. These include alpha back-scattering, gamma ray spectroscopy, and the simple but elegant foot-pad magnet carried by several Surveyor spacecraft. The next

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chapter covers instruments and techniques under development when the book was written; several of these, in particular Adler's X-ray fluorescence experiment and Arnold's gamma ray spectroscopy experiment, have since been flown successfully on Apollo 15. Next is an informative and timely chapter on the Lunar Receiving Laboratory, in which preliminary analyses of returned lunar samples are performed, followed by a chapter on the complex subject of data processing analysis. The book concludes with a chapter on possible future compositional experiments; this should actually be read first, since it includes an excellent summary of the parameters to be measured by the various experiments, such as X-rays, neutron albedo, and infrared emission. The major weakness in "Geochemical Exploration" is its organization, which is fundamentally chronological. A treatment based on parameters measured would have been more effective, in my opinion. The weakness is unfortunately compounded by a remarkably poor job of typographic layout, in which all headings and subheadings have identical type, with no indentation or other visual subdivision. The book is also marred by many typographical errors, misspellings, and even punctuation errors; the authors have been poorly served by their publisher in this regard.

Despite these failings, many of which can be easily corrected in a later printing, Adler and Trombka have written an excellent book which should be of great interest to a wide range of scientists and engineers. In collecting a huge mass of obscure but important information, "Geochemical Exploration" is about the only game in town.